

IN THE CLAIMS:

Claims 1-20 (Canceled)

21. (Currently Amended) An antenna structure, comprising:

[an] a planar antenna trace formed on a substrate;

a ground plane formed on said substrate, wherein a plane of said substrate on which said planar antenna is located is co-planar or parallel with a plane of said substrate on which said ground plane is located, and said ground plane is non-overlapping with said planar antenna trace; and

an insulation region extending through said substrate and located between said planar antenna trace and said ground plane.

22. (Currently Amended) The antenna structure recited in Claim 21, ~~wherein said ground plane is coplanar with said antenna trace~~ wherein said planar antenna trace is a first planar antenna trace and said antenna structure further includes a second planar antenna trace located on an opposing, parallel surface of said substrate and said first and second planar antenna traces are interconnected by a via extending through said substrate.

23. (Previously Presented) The antenna structure recited in Claim 21 wherein said insulation region includes a plurality of insulation regions.

24. (Previously Presented) The antenna structure recited in Claim 23 wherein each of said insulation regions are separated by a portion of said substrate.

25. (Previously Presented) The antenna structure recited in Claim 21 wherein said insulation region is an opening that extends through said substrate and an insulator of said insulation region is air.

26. (Previously Presented) The antenna structure recited in Claim 21 wherein said insulation region includes an insulation material selected from a group consisting of:

ABS plastic;

ceramic; and

Teflon.

27. (Previously Presented) The antenna structure recited in Claim 21 wherein said substrate is a lossy substrate and said insulation region causes an antenna radiation efficiency of said antenna structure to be about -0.5dB or better.

28. (Currently Amended) A method of manufacturing an antenna structure, comprising:
forming [an] planar antenna trace on a substrate;
forming a ground plane on said substrate, wherein a plane of said substrate on which said planar antenna is located is co-planar or parallel with a plane of said substrate on which said ground plane is located, and said ground plane is non-overlapping with said planar antenna trace; and
creating an insulation region extending through said substrate and located between said planar antenna trace and said ground plane.

29. (Currently Amended) The method recited in Claim 28, ~~wherein said ground plane is coplanar with said antenna trace~~ wherein said planar antenna trace is a first planar antenna trace and said antenna structure further includes a second planar antenna trace located on an opposing, parallel surface of said substrate and said first and second planar antenna traces are interconnected by a via extending through said substrate.

30. (Previously Presented) The method recited in Claim 28, wherein said creating includes creating a plurality of insulation regions.

31. (Previously Presented) The method recited in Claim 28, wherein said creating a plurality of insulation regions includes creating a plurality of insulation regions separated by a portion of said substrate.

32. (Previously Presented) The method recited in Claim 28, wherein said creating an insulation region includes creating an opening that extends through said substrate and wherein an insulator of said insulation region is air.

33. (Previously Presented) The method recited in Claim 32, wherein said creating an opening includes drilling a hole in said substrate.

34. (Previously Presented) The method recited in Claim 28, wherein said creating includes creating an insulation region having an insulation material selected from a group consisting

of:

ABS plastic;

ceramic; and

Teflon.

35. (Currently Amended) The method recited in Claim 28, wherein said forming includes forming antenna traces located on opposing surfaces of said substrate interconnected by a via extending through said substrate.

36. (Currently Amended) A printed circuit board (PCB), comprising,
a substrate having a ground plane and conductive traces formed thereon; and

[an] a planar antenna structure, including:

an antenna trace formed on said substrate;

said planar ground plane formed on said substrate, wherein a plane of said substrate on which said planar antenna is located is co-planar or parallel with a plane of said substrate on which said ground plane is locate, and said ground plane is non-overlapping with said antenna trace;
and

an insulation region extending through said substrate and located between said antenna trace and said ground plane.

37. (Currently Amended) The PCB recited in Claim 36, ~~wherein said ground plane is co-planar with said antenna trace~~ wherein said planar antenna trace is a first planar antenna trace and

said antenna structure further includes a second planar antenna trace located on an opposing, parallel surface of said substrate and said first and second planar antenna traces are interconnected by a via extending through said substrate.

38. (Previously Presented) The PCB recited in Claim 36, further including electrical components mounted on said substrate and interconnected between at least one of said conductive traces and said ground plane to form an operative circuit.

39. (Previously Presented) The PCB recited in Claim 36, wherein said insulation region includes a plurality of insulation regions separated by a portion of said substrate.

40. (Previously Presented) The PCB recited in Claim 36, wherein said insulation region is an opening that extends through said substrate and an insulator of said insulation region is air.

41. (Previously Presented) The PCB recited in Claim 36, wherein said insulation region includes an insulation material selected from a group consisting of:

ABS plastic;

ceramic; and

Teflon.